



PEN 45 and PEN 45DD.

BEAM POWER AMPLIFIERS FOR A.C. MAINS

RATING.

	Pen.45	Pen.45DD.
Heater Voltage	4.0	4.0
Heater Current (amps.)	1.75	2.0
Maximum Anode Voltage	250	250
Maximum Screen Voltage	250	250
*Mutual Conductance (mA/V)	9.0	9.0

*At $E_a=100$; $E_s=100$; $E_g=0$.

TYPICAL OPERATION (Both Types).

Anode Voltage		250
Screen Voltage		250
Grid Bias Voltage		8.5
Quiescent Anode Current (mA)		40
Quiescent Screen Current (mA)		7.5
Power Output (watts)	4.85*	5.8†
Anode Load (ohms)	5,200*	4,500†
Input Swing R.M.S.	4.0*	5.0†
Anode Current (mA) (with input swing)	41.5*	42.5†
Input Swing (volts RMS) for 50 mW	0.36	0.38
Input Swing (volts RMS) for 250 mW	0.81	0.85
Self Bias Resistance (ohms)		175

*For 5 per cent. Third Harmonic, and Second Harmonic not exceeding 5 per cent.

†For 7 per cent. Third Harmonic, and Second Harmonic not exceeding 7 per cent.

DIMENSIONS.

	Pen.45	Pen.45DD
Maximum Overall Length	110	134 mm.
Maximum Diameter	45	45 mm.

INTER-ELECTRODE CAPACITIES.

*Anode to Earth	12.25	12.75 $\mu\mu\text{F.}$
*Grid to Earth	22.75	19.5 $\mu\mu\text{F.}$
Anode to Grid	0.85	0.7 $\mu\mu\text{F.}$
*Diode 1 to Earth		4.5 $\mu\mu\text{F.}$
*Diode 2 to Earth		4.5 $\mu\mu\text{F.}$
Diode 1 to Diode 2		0.05 $\mu\mu\text{F.}$

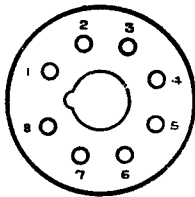
*"Earth" denotes the electrodes of any second valve section and the remaining earthy potential electrodes of the section under measurement, H and M joined to cathode.

GENERAL.

The Pen.45 and Pen.45DD. are indirectly heated beam power amplifiers for use in A.C. mains. In the latter a double diode section is added which is completely screened within the valve from the pentode section, so that the two sections may be treated as two separate valves as far as circuit considerations are concerned. The bulbs are of reduced dimensions and each are partly metallised. The characteristics of the two types are identical and the valves are fitted with a British Octal Base, the connections to which are given overleaf.

APPLICATION.

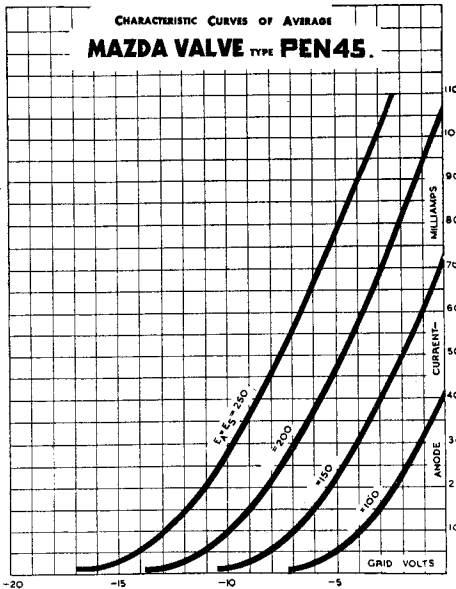
Both valves are designed for use with screen voltages of 250 volts and a mean anode dissipation of 10 watts. It is recommended that the grid bias be obtained by means of a self bias resistor, and the resistance of the grid to cathode circuit should not exceed 1 megohm. Due to the large gain, an electrolytic condenser of 50 to 75 μ F. across the self bias resistance, or decoupling the grid circuit in the usual manner, will prevent attenuation of the lower audio frequencies. Anti-parasitic resistances should be included in the grid and/or anode circuits. To obtain optimum performance, the anode load should not be higher than that recommended, and consideration must be given to any rise of load with frequency or loss of output will result. In the case of the Pen.45DD, one diode (D2.) is employed as an audio detector, while the other diode (D1.) is employed to provide the A.V.C. voltage. The load resistance of the detector diode should be returned to the cathode, while that in circuit with the anode of the A.V.C. diode should be returned to a negative potential to provide the requisite delay voltage. This should be between 15 and 20 volts.



Viewed from the free end of the base.

BASING.

	Pen.45	Pen.45DD.
Pin No. 1.	Heater.	Heater.
2.	Cathode.	Cathode.
3.	Anode.	Anode.
4.	Screen.	Screen.
5.	Control Grid.	Diode 2.
6.	Metallising.	Metallising.
7.	Omitted.	Diode 1.
8.	Heater.	Heater.
Top Cap.	—	Control Grid



Mazda Radio Valves are manufactured in Great Britain for the British Thomson-Houston Co. Ltd. London and Rugby.